Coopetition Strategy for Business Sustainability: A State-of-the-Art Review

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ABSTRACT

In today's competitive business environment and the rapidly evolving digital age, businesses move toward simultaneous competition and collaboration to achieve their goals. Coopetition, a term blending cooperation and competition, is rooted in the principles of game theory. This strategic approach has the potential to significantly enhance business sustainability. As a relatively new and evolving paradigm in business management, sustainability emphasizes the integration of environmental, social, and economic factors into organizational practices. This emerging concept reflects a growing commitment to balancing these dimensions in pursuit of long-term success. This study investigates the consequences of coopetition for business sustainability using a systematic review methodology. After reviewing relevant articles in Scopus and web of science databases, 51 articles were selected for coding. The consequences of using coopetition as a strategy for sustainability were extracted and classified into three categories: environment, social, and economic dimensions.

KEYWORDS

Business Model, Competition, Cooperation, Coopetition, Sustainability.

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Introduction

Sustainable development represents one of the most pressing challenges of contemporary society, requiring the responsible and efficient management of limited resources. Firms play a pivotal role in this domain as they directly influence how resources are utilized. Efficient resource management is crucial to ensuring their sustainability. The push for sustainable development has broadened the scope of resource efficiency to include environmental and social resources. One strategy for achieving more sustainable resource utilization involves adopting a circular approach, where firms share resources and facilitate exchanges among various stakeholders. This approach often requires competing firms to engage in coopetition—a dynamic strategy that blends competition and cooperation. Extensively explored in management literature, coopetition offers several advantages, including fostering innovation in business models, improving market positioning, enhancing production efficiency, and accelerating new product development (Manzhynski & Figge, 2020).

Corporate management is vital in moving towards sustainability. Achieving sustainable development relies significantly on businesses actively addressing and contributing solutions to sustainability challenges. The emphasis is placed on coopetition strategy that enables businesses to enhance their economic, social, and environmental performance while contributing positively to society by addressing issues such as cleaner air, water scarcity, and improved environmental management. Coopetition is a strategic approach where competing organizations actively collaborate while maintaining competition, aiming to achieve shared benefits and mutual growth (Christ et al., 2017). Coopetition strategy is based on the concept that competitors can collectively generate and share value, thereby expanding market opportunities and finding new ways to mitigate threats facing all firms involved. In today's world, strategic alliances, collaborations, networks, and the exchange of relevant information between firms are all recognized as ways in which businesses work together and can improve overall performance through partnership (Munten et al., 2021).

Coopetition can occur among various types of organizations, such as those in the manufacturing, service, government, and non-governmental sectors. From the point of view of sustainability, coopetition helps sustainability when it has a positive contribution at the social level. The positive results of companies' coopetition are mainly assessed at the individual level of firms. Cooperating while competing for sustainability can lead to beneficial outcomes, not only for the businesses engaged but also for society as a whole. Integrating cooperation and competition creates synergistic advantages for participating firms, often resulting in improved performance. Research indicates that these benefits extend to sustainability outcomes as well. Manzhynski and Figge (2020) explored the limited research available on the intersection of coopetition and sustainability, examining the underlying reasons for this gap in the literature. They found two reasons: Firstly, there is a possible conflict between economic outcomes and environmental or social impacts. Coopetition may positively influence one dimension while simultaneously negatively

impacting another. To gain deeper insights into how coopetition affects sustainability, comprehensive research is needed to distinguish its various consequences on sustainability. Secondly, current coopetition research primarily emphasizes the benefits it provides to firms. However, when considering sustainability in a broader social context, these outcomes need to be assessed at the macro level.

This paper aims to propose a framework addressing the implications of coopetition for sustainability. The structure of the paper is as follows: Section 2 provides a review of the key concepts and an overview of previous studies on coopetition for sustainability. Section 3 outlines the research methodology. Section 4 presents the research findings, and Section 5 concludes the paper with reflections on future research directions.

Literature Review

In this section, we begin by introducing the key research concepts and then provide an overview of the relevant literature on coopetition for sustainability.

Coopetition

Coopetition, a neologism that combined cooperation and competition, was coined by Novell founder Ray Noorda in 1980_s. Then, Brandenburger and Nalebuff (1996) published a book entitled "Coopetition," which led to popularize the concept of coopetition. They defined Coopetition as a relationship where firms actively participate in cooperation and competition. Coopetition can be described as a process in which players gradually adopt clear and significant cooperative behaviors (Frisio et al., 2012). Hannah and Eisenhardt (2018) defined coopetition as cooperation and competition at the same time within the same industry. Research on coopetition has increased significantly in recent years. In other words, research on the concept that firms simultaneously cooperate and compete to create value has gained momentum recently.

Coopetition, the simultaneous cooperation and competition among competing firms to create value, has become a compelling strategy for the more effective use of complementary resources (Meena et al., 2023). This strategy primarily aims to foster mutually advantageous collaborations, enhancing value for both of the involved parties. However, this concept is not recognized as a new concept. For decades, businesses across various industries have employed this strategy to pursue various strategic objectives. Research on this concept can be classified depending on three flows: why (antecedents, motives, likelihood), how (interaction, process, tension, managing and shaping), and what (consequences, outcome, cause-and-effect) (Peng et al., 2018).

Clarke-Hill and Davies (2003) maintained that game theory and the resource-based view are two prominent theories associated with competition. However, it is important to note that these are not the only theoretical frameworks relevant to competition. Other perspectives, such as paradox theory, network theory, and transaction cost economics, also provide valuable insights (Charleton et al., 2018). Coopetition operates on three distinct levels: the intra-firm level, the inter-firm level, and the network level (Dorn et al., 2016). At the inter-organizational level, coopetition emerges when firms engage with one

another in a way that synthesizes their respective interests. By collaborating, they create value that would be unattainable individually. Moreover, coopetition can occur horizontally and vertically, involving competitors across different value chain stages (Dagnino, 2009).

Four main research streams have been identified regarding the concept of coopetition. The first approach views coopetition as a process or a series of deliberate actions undertaken by competitors to establish rules for balancing competition and cooperation, aiming to reach mutually beneficial agreements. The second approach regards coopetition as a phenomenon or event that emerges independently of societal or economic norms. The third approach conceptualizes coopetition as a behavioral response to the pressures of global hyper-competition. Finally, the fourth approach defines coopetition as a paradox—a set of interdependent relationships characterized by inherent logical contradictions (Shvindina, 2019).

Despite its advantages, coopetition poses significant challenges due to its paradoxical and risky dynamics. Companies often face cognitive and behavioral dilemmas, including tensions, opportunistic behavior, and the risk of knowledge leakage, which can undermine the relationship (Le Roy & Fernandez, 2015; Raza-Ullah, 2020). Because of its complexity, coopetition is considered one of the most intricate and demanding organizational phenomena (Gernsheimer et al., 2021). Nevertheless, firms across various industries are increasingly adopting coopetition as a strategic practice, seeking to leverage its synergistic benefits for competitive advantage.

Coopetition relationships are evident across various industries, offering compelling examples of collaborative strategies between competitors. For instance, the American automaker Ford and Germany's Volkswagen Group recently announced a renewed partnership to develop and distribute electric and autonomous vehicles, reviving a collaboration that had previously ended unsuccessfully (Rauwald & Naughton, 2020). Similarly, the COVID-19 pandemic prompted several multinational pharmaceutical companies to partner with smaller firms to accelerate the development and production of coronavirus vaccines. The collaboration between Pfizer and BioNTech in creating a COVID-19 vaccine is a notable example of a coopetition strategy (Crick & Crick, 2020).

In higher education, the edX platform demonstrates coopetition through innovation. In 2012, two historic rivals, Harvard and MIT, joined forces to launch one of the first virtual learning platforms, providing seamless online access to their courses (Garrett, 2016). Another prominent example is the partnership between Apple and Google, which collaborated to develop contact-tracing technology aimed at mitigating the spread of COVID-19 (Brandenburger & Nalebuff, 2021). These cases underscore the diverse applications of coopetition strategies in addressing complex challenges and fostering innovation.

Innovation is a central topic within the study of coopetition, often serving as one of the most examined outcome variables in this context (Bengtsson & Raza-Ullah, 2016). Recognized as a primary driver of competitive advantage, innovation relies on the

development and integration of new knowledge. However, many firms face challenges in fostering innovation due to limited resources or inadequate internal capabilities. To address these limitations, companies often turn to external sources of knowledge through inter-organizational agreements and partnerships.

These collaborations frequently occur between competitors and involve either standardizing existing solutions or co-developing new ones, with both parties sharing the associated risks and costs of research and development. Such partnerships are defined by cooperative and competitive dynamics, shaped by trade-offs involving fairness versus opportunism, sharing versus control, and engagement versus rivalry. This duality, where competition and cooperation coexist, is referred to as *coopetition* (Ricciardi et al., 2022).

Cooptative relationships balance these opposing forces and are generally more conducive to innovation than strategies based solely on cooperation or competition. By enabling knowledge exchange, joint technology development, and shared risk-taking, coopetition provides a strategic advantage in driving innovation. However, the competitive aspects of these arrangements can sometimes lead to opportunistic behaviors, such as knowledge leakage, which may limit the innovation potential of the partners involved. Additionally, research suggests that coopetition is particularly suited to incremental innovation rather than radical innovation (Corbo et al., 2022).

Digital Coopetition

Digital coopetition provides new insight into the cooperative–competitive dynamics, especially significant in industries that take advantage of digital technology as the cornerstone of their value creation and capture strategies. Although traditional coopetition was prevalent in areas where digital systems were of limited use, such as tourism or food industries (Gernsheimer et al., 2021; Gnyawali & Charleton, 2018), the rapid expansion of digital ecosystems in recent years has made the emergence of a new perspective urgent. Digital Coopetition is applied to a relationship based on simultaneous cooperation and competition, while both are founded on technology and digital systems. In other words, in digital coopetition, competition utilizes digital tools to collect and process data and shape a relationship based on mutual benefit with their customers.

Digital coopetition averages specific technologies that help firms engage in simultaneous cooperation and competition. These innovative technologies include a wide array of digital systems and services such as platform systems, data analysis tools, cloud competing, and the internet of things (IOT). Platform technologies, such as those used by Uber and Airbnb, provide an interaction between firms and companies in a digital platform. Mobil technologies use GPS to enhance location-based services, while analysis tools provide companies with help in other for them to improve their operations. Cloud and IOT technologies provide networks that enables devices to connect and share data more conveniently. Together, all these digital tools help companies to improve their services, engage directly and more easily with customers, and establish a better competitive relationship (Reischauer & Hoffmann, 2023).

Digital coopetition has different stages, namely Initiation, Execution, and Termination.

In each of these stages, digital coopetition is different from traditional coopetition, because it allows for a fast and easy entry thanks to its transparent platforms and law-switching expenses. In addition, in its Execution stage, digital coopetition uses real-time digital metrics, while in traditional cooption, evaluation is much longer. In addition, in the ending phase, the functions of traditional and digital coopetition are also different. Traditional coopetition comes to an end basically as a result of issues like knowledge leakages (Raza-Ullah, 2020), while digital coopetition comes to an end when the planned advantages are achieved. This flexibility enabled by technology has reshaped the complex relationship between cooperation and competition (Reischauer & Hoffmann, 2023).

Sustainability

As Kidd (1992) highlighted, the concept of sustainability is not new but has a long history, evolving over time under the influence of various streams of thought and political ideologies. Notably, in academic and scientific circles, the terms "sustainability" and "sustainable development" are often used interchangeably, as observed in the literature. The Brundtland Report, *Our Common Future* (1987), published by the World Commission on Environment and Development, defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987, p.). Sustainable development generally has three main dimensions: environmental, social, and economic (UN.ESCAP, 2015).

Although many researchers use the terms “sustainable development” and “sustainability” interchangeably, some make a clear distinction between them. Simply put, sustainability is a long-term goal, whereas sustainable development refers to the processes and paths that lead to achieving that goal. Sustainability, therefore, is a broader term than sustainable development. Additionally, some scholars argue that sustainable development is a macro-level concept aligned with economic development, whereas sustainability is often discussed at the individual or organizational level (Mahajan, 2022).

Regarding the concept of sustainability, three pillars have been proposed: environmental, social, and economic dimensions.

1. *Environmental Pillar*: A key discourse in sustainability is the *environmental discourse*, which connects sustainability to the relationship between humans and nature, emphasizing the preservation of natural resources (Hanss & Böhm, 2012). Growing concerns about global environmental challenges, coupled with skepticism about the ability to significantly reduce industrial pollution, led the United Nations to recognize these issues as barriers to sustainable development. The Stockholm Conference played a pivotal role in establishing the United Nations Environment Program and numerous national environmental protection agencies.

2. *Social Pillar*: As highlighted by Dempsey et al. (2011), the World Commission on Environment and Development's (WCED) definition of sustainability underscores the importance of intergenerational equity, focusing on social factors such as social justice, distributive justice, and equality of conditions. Social discourse has also been shaped

within the corporate sphere, linking sustainability to the concept of corporate social responsibility (CSR). CSR is defined as a firm's commitment to pursue policies, make decisions, or engage in actions that align with societal goals and values (Farcane & Bureana, 2015). Additionally, employment issues—particularly the potential for creating new jobs in both the short and long term—are critical from the social dimension of sustainable development (Kasztelan, 2017).

3. *Economic Pillar*: The economic aspect of sustainability focuses on the relationship between businesses and the social and environmental challenges they face. From an economic perspective, sustainability pertains to a company's ability to thrive over time by maintaining profitability, productivity, and strong financial performance while effectively managing the environmental and social resources that form its capital.

Sustainable Business Model

Integrating sustainability into business operations remains a relatively new concept for startups, small and medium-sized enterprises (SMEs), and even large multinational corporations. Sustainable business models (SBM) have gained global attention, with design thinking increasingly employed to support this transition (Kurek et al., 2023). A sustainable business model can be defined as "a business model that creates, delivers, and captures value for all its stakeholders without depleting the natural, economic, and social capital it relies on" (Breuer & Lüdeke-Freund, 2014). This concept explains how an organization creates, delivers, and captures value economically, socially, culturally, or otherwise sustainably (Nosratabadi et al., 2019).

A sustainable business model offers competitive advantages by enabling conventional business models to achieve sustainable development goals while maintaining productivity and profitability (Broccardo et al., 2023). Building a sustainable business model is an innovative aspect of a business strategy, and various industries and organizations have adopted this approach to meet their economic, environmental, and social objectives concurrently. Sustainable business models promote social and environmental sustainability within industrial systems (Ludeke-Freund, 2010).

Historically, many business models did not prioritize sustainability, despite its significant social and environmental impacts on both humans and nature. However, business models aimed at achieving corporate sustainability goals gradually evolved to contribute to a more sustainable economic system (Geissdoerfer et al., 2018).

Sustainable business models leverage comprehensive management strategies, innovation, and a long-term perspective to fulfill sustainability objectives. As a result, these models have contributed to mitigating the negative impacts of business operations on the environment and society by offering solutions that enable companies to simultaneously meet their economic and sustainability targets (Nosratabadi et al., 2019). These models possess significant potential to embed sustainability principles and align sustainability objectives with value proposition, value creation, and value capture within businesses (Broccardo et al., 2023). In other words, Porter and Kramer (2011) suggest that sustainable business models provide a competitive edge by integrating sustainable

value propositions, value creation, and value capture mechanisms, which in turn deliver economic advantages to companies.

Sustainable business models consider a broad spectrum of stakeholder interests, encompassing environmental and societal concerns. Bocken et al. (2014) proposed a sustainable business model framework that included three main categories: technological, social, and organizational aspects. Each of these categories featured several archetypes, with examples provided for each. In a later work, Bocken et al. (2019) introduced an updated version of the sustainable business model, focusing on three key dimensions: environmental, social, and economic. The environmental dimension includes three archetypes: maximizing material and energy efficiency, closing resource loops, and substituting with renewable resources and natural processes. The social dimension encompasses three archetypes: delivering functionality rather than ownership, adopting a stewardship role, and encouraging sufficiency. Finally, the economic dimension consists of three archetypes: repurposing for societal or environmental benefits, creating inclusive value, and developing scalable, sustainable solutions.

In the following, we present a summary of previous research on coopetition for sustainability.

Table1.
Summary of Previous Studies

Authors	Title	Findings
Carfì & Schilirò (2012)	A Coopetitive Model for the Green Economy	The article introduces a cooperative-competitive model designed for the Green Economy—an economic framework focused on sustainable development. This approach aims to enhance human well-being, promote social equity, and substantially minimize environmental risks and ecological shortages.
Christ et al., (2017)	Coopetition as a Potential Strategy for Corporate Sustainability	This article explores a coopetitive agreement between two leading players in the Australian wine industry to establish a bottling plant in England. By collaborating despite being competitors, the two companies enhance resource efficiency, improve their environmental performance, and bolster their competitive standing within the industry.
Jafarnejad et al., (2020)	A Comprehensive Strategy for Collaboration and Coopetition Among Bio-Refineries, Taking into Account Sustainability Factors and Government Interventions	This study introduces a nonlinear model that seeks to determine the ideal quantity of biofuel production while considering the collaboration between bio-refineries and government financial interventions.
Planko et al., (2019)	Navigating Coopetition: Addressing Challenges in Collaborative Efforts for Sustainable Development - The Case of the Dutch Smart Grid Industry	This article contended that businesses aiming to adopt intricate innovative technologies that promote sustainable development must work with various participants in the innovation ecosystem, including their rivals. This paper is one of the first studies exploring the coopetition strategy for sustainable development at network level.
Sharma & Singh (2017)	Servitization, Coopetition, and Sustainability: An Operations Perspective in the Aviation Industry	This article investigated the cooperation of three airline companies in resource sharing to provide services. Shared use of resources and equipment, cooperation in supplying aircraft spare parts, resource pooling, centralization of locations, and lateral shipments create collaborative consumption that reduces the amount of equipment needed and dematerialization. As a result, coopetition reduces negative environmental effects and decreases energy consumption.
Manzhynski & Figge (2020)	Coopetition for Sustainability: Balancing Organizational Benefits and Societal Good	In this case study, the researchers showed that coopetition affects resource efficiency. The researchers expressed the value created through coopetition in monetary terms as the additional profit created compared to the situation without cooperation between competitors. They found that firms engaged in coopetitive relationships in two economic and environmental dimensions contributed positively to sustainability.

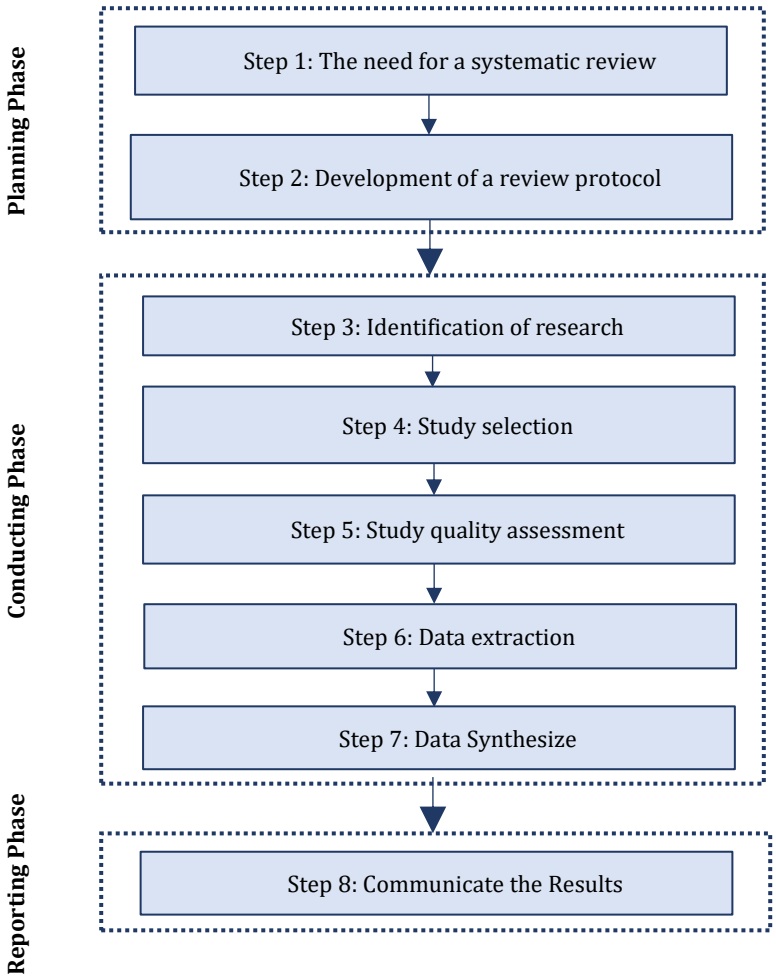
(Source: Researcher's Findings)

Previous studies have explored individual or multiple consequences of coopetition for sustainability. This study aims to address the research gap by presenting a comprehensive framework of the consequences of coopetition for sustainability, utilizing a systematic review method to synthesize and organize existing findings.

Methodology

This article's research methodology is a systematic review of published studies on coopetition for sustainability. Sustainability is viewed here as one of the outcomes of adopting a coopetition strategy. A systematic review involves a thorough search and assessment of existing research and documents related to the research question to obtain a comprehensive understanding of the topic (Grant & Booth, 2009). It is a structured and exhaustive literature review focusing on a clearly-defined research question, following a precise and well-established protocol. Kitchenham (2004) outlined guidelines for conducting a systematic review, which include three main phases- planning, conducting, and reporting- along with eight specific steps to follow during the review process.

Figure 1.
Steps Followed for a Systematic Review of Literature



(Source: Researcher's Findings)

Planning Phase

Step 1: The Need for a Systematic Review

The need for a systematic review arises from the necessity for researchers to consolidate and summarize all existing knowledge on specific topics. This research was motivated by the existing gap in coopetition for sustainability. Specifically, there is a significant lack of studies that explore sustainability as an outcome of coopetitive strategies.

Step 2: Development of a Review Protocol

Experts widely regard the development of a research protocol as the most critical step in systematic review research. The protocol serves as a crucial document that guides researchers through the review process by providing a detailed action plan. It ensures the research is conducted systematically and minimizes potential bias.

A key activity in this step is formulating a clear and precise research question. A well-defined question sets the course for the study and helps maintain focus, ensuring the researcher stays on the intended path. The research question for this study is: What are the consequences of coopetition strategy for sustainability?

Conducting Phase

Step 3: Research Identification

The concept of coopetition has seen significant growth in recent years. The chart below illustrates the increasing number of publications in the field of coopetition. This data is sourced from the Scopus database.

Figure 2.
The Number of Documents Published in Coopetition

(Source: Researcher's Findings)

The goal of a systematic review is to find a large number of primary studies relevant to the research question. It is necessary to assign and follow a search strategy. To perform this step, the words related to the research question were searched in the scientific databases of Web of Science and Scopus.

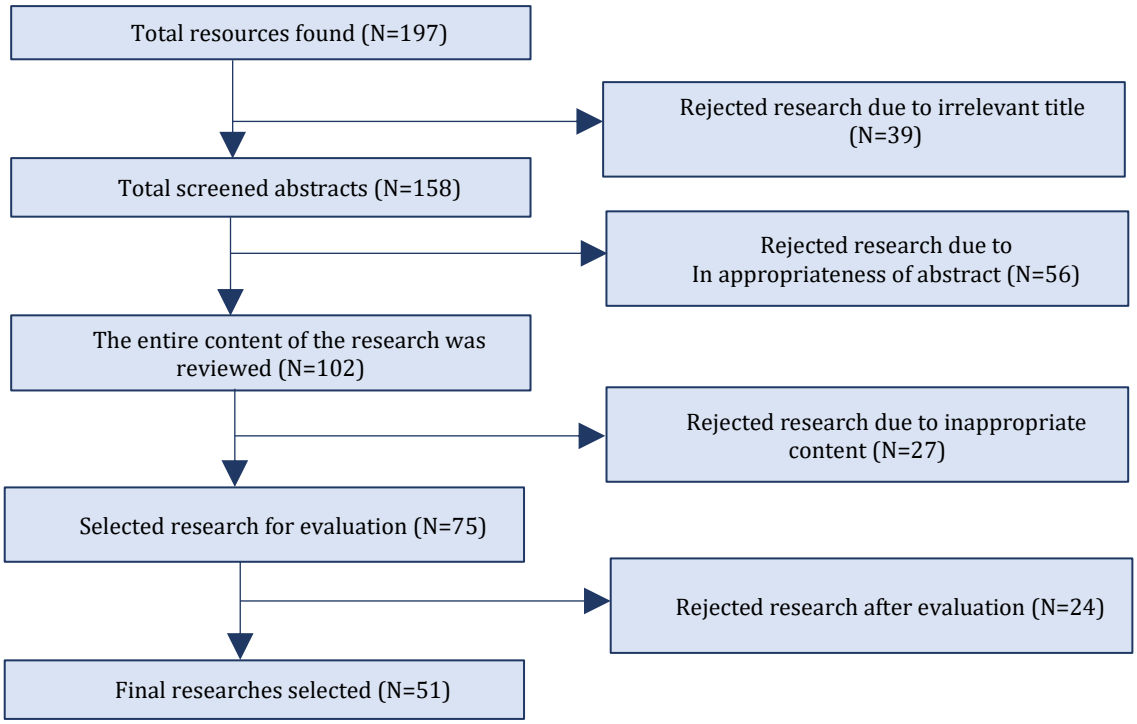
The search formula is as follows:

> "Coopetition" and "sustainability" OR "co-opetition" and "sustainability" OR "coopetition and sustainable development" OR coopetition consequences OR "coopetition" and "green energy" OR "coopetition" and "green product"

Step 4: Study Selection

Study selection is a multi-step process. The first step involves establishing selection criteria, including language, publication year, and type of sources. Keywords related to the research question were searched in two academic databases, Scopus and Web of Science, from 1996 to 2024. 1996 was chosen as the starting point because articles on coopetition in the Web of Science database began to be published from that year. All selected articles were in English.

Figure 3.
Algorithm for Selecting the Final Articles



(Source: Researcher's Findings)

In this section, the Inclusion and exclusion criteria of the articles were specified. In the end, 51 articles were selected to extract the consequences of coopetition for sustainability.

Step 5: Study Quality Assessment

There is no agreement among experts on the definition of quality. Some consider the

internal and external validity of articles as quality. To evaluate the quality of the articles, the relevance of the content of the articles to the research question and their internal and external validity were considered.

Step 6: Data Extraction

In this phase, a total of 38 consequences of coopetition for sustainability were identified from 51 selected articles. This identification process was carried out manually.

Step 7: Data Synthesize

These 38 identified codes were classified into 3 categories of environmental, social, and economic.

Table 2.
The Framework of Coopetition Consequences for Sustainability

Code	Authors	Category
Generating less waste	Carf et al., (2020); Volschenk (2018)	Environmental
Recycling waste	Carf et al., (2020); Filimonau (2021)	
Decreasing emissions	Christ et al., (2017); Trapp et al., (2020); Fallahi et al., (2022); Kavirathna et al., (2020); Tokunaga et al., (2019)	
Pollution Reduction	Carf et al., (2020); Carfi & Donato (2022); Filimonau, (2021); Xin et al., (2022)	
Preserving Bio-Resources	Carfi & Donato (2022)	
Using Green-Packagin	Carfi & Donato (2022); Ohtonen (2019)	
Renewable energy	Gao et al., (2023); Paravantis & Kontoulis (2020); Herbst (2019)	
Obtaining the optimum amount of biofuel production	Jafarnejad et al., (2020)	
Resource loops and use resources in more circularly	Manzhynski & figge (2020); Herbst (2019)	
Producing and selling green technological goods	Carfı et al., (2021); Xu et al., (2022); Shi et al., (2022); Xin et al., (2022); Felzensztein et al., (2018)	
Green energy production	Carfı et al., (2021); Doren (2020)	
Green supply chain (green logistics)	Limoubpratum et al., (2015)	
Declining energy consumption	Sharma & Singh (2017); Hafezalkotob (2017)	
Dematerialize	Sharma & Singh (2017)	
Natural environment protection	Nguyen et al., (2022)	
Social welfare	Hafezalkotob (2017); Carfi & Schilirò (2012); Huang et al., (2020)	Social
Social equity	Carfi & Schilirò (2012)	
Greater consumer surplus	Huang et al., (2020)	
Heritage preservation	Nguyen et al., (2022)	
Community involvement	Nguyen et al., (2022)	
Infrastructure voids and protection/promotion of industry legitimacy	Peloza & Falkenberg (2009)	
Delivery ownership (use resources without owning)	Sharma & Singh (2017)	
Health	Crick & Crick (2020)	

Code	Authors	Category
Improving Educational system	Stadtler & Van Wassenhove (2016); Dal-Soto & Monticelli (2017)	
Change in society's attitude	Kaempf (2022)	
Corporate social responsibility	Kumar et al., (2021)	
Resource and capacity sharing	Gnyawali & Park (2011); Trapp et al., (2020); Herbst (2019); Planko et al., (2019)	Economic
Create value	Ritala & Tidstr¨om (2014); Ko et al., (2020); Volschenk et al., (2016);Rodríguez et al., (2024)	
Shared value	Berti et al., (2017); Herbst (2019)	
Reduce Cost	Volschenk et al. (2016); Trapp et al., (2020); Kaempf (2022)	
knowledge sharing	Abubakar (2024)	
Open Innovation	Mention (2011); Hameed & Naveed (2019); Corbo et al., (2022); Abubakar (2024); Lee & Roh (2023a, 2023b)	
Cheaper services	Mirzabeiki et al., (2021)	
Energy-saving	Hafezalkotob (2017); Jafarnejad et al., (2020); Liu & Pan (2022); Carfı et al., (2020); Hafezalkotob (2018)	
Energy efficiency	Adhikary et al., (2019); Kim (2014)	
Increase or optimization of economic performance	Kaempf (2022)	
Reduction of business risk	Kaempf (2022)	
Digitalization capability	Lee & Roh (2023a, 2023b)	

(Source: Researcher's Findings)

Cohen's kappa coefficient can be used to measure the reliability of qualitative studies. For this purpose, three articles out of 51 articles were randomly given to a strategic management PhD expert. The expert coded the articles without knowing the researcher's codes. The expert extracted 10 codes from the three articles, while the researcher extracted 12 codes from them, 10 of which were the same as the expert's codes.

Table 3.
Coding Agreements

		Author		
		yes	NO	total
Expert	YES	A=10	B=1	11
	NO	C=2	D=0	2
	total	12	1	N=13

(Source: Researcher's Findings)

$$pr(a) = \frac{A + D}{N} = 0.769$$

$$pr(e) = \frac{A+D}{N} \times \frac{A+C}{N} \times \frac{C+D}{N} \times \frac{B+D}{N} = 0.00841$$

$$\text{Kappa} = \frac{pr(a) - pr(e)}{1 - pr(e)} = 0.77$$

Table 4.
Interpretation of the Kappa Coefficient

K	degree of agreement
k≤0	Strong disagreement
0.00-0. 2	Very poor agreement
0. 21-0.4	Low agreement
0.41-0.6	Average agreement
0.61-0.8	Satisfactory agreement
0.81-1.00	Excellent agreement

(Source: Researcher's Findings)

In this study, the kappa coefficient is 0.77, so there is satisfactory agreement.

Reporting Phase

The reporting phase involves a single step: communicating the results, which has been presented in the research findings section of this paper.

Finding

Coopetition strategy helps the environmental dimension of sustainability by generating less waste, recycling waste, decreasing emissions and pollution, declining energy consumption, preserving bio-resources, using green packaging, and obtaining the optimum amount of biofuel production. One of the important ways to increase the efficiency of resource consumption is to close resource loops and use resources in a more circular way; this requires the cooperation of competing resource users. Dematerializing, protecting natural environment, and using and producing renewable energy are other consequences of coopetition for environmental dimension of sustainability. Also, coopetition strategy contributes to green logistics and sustainable distribution.

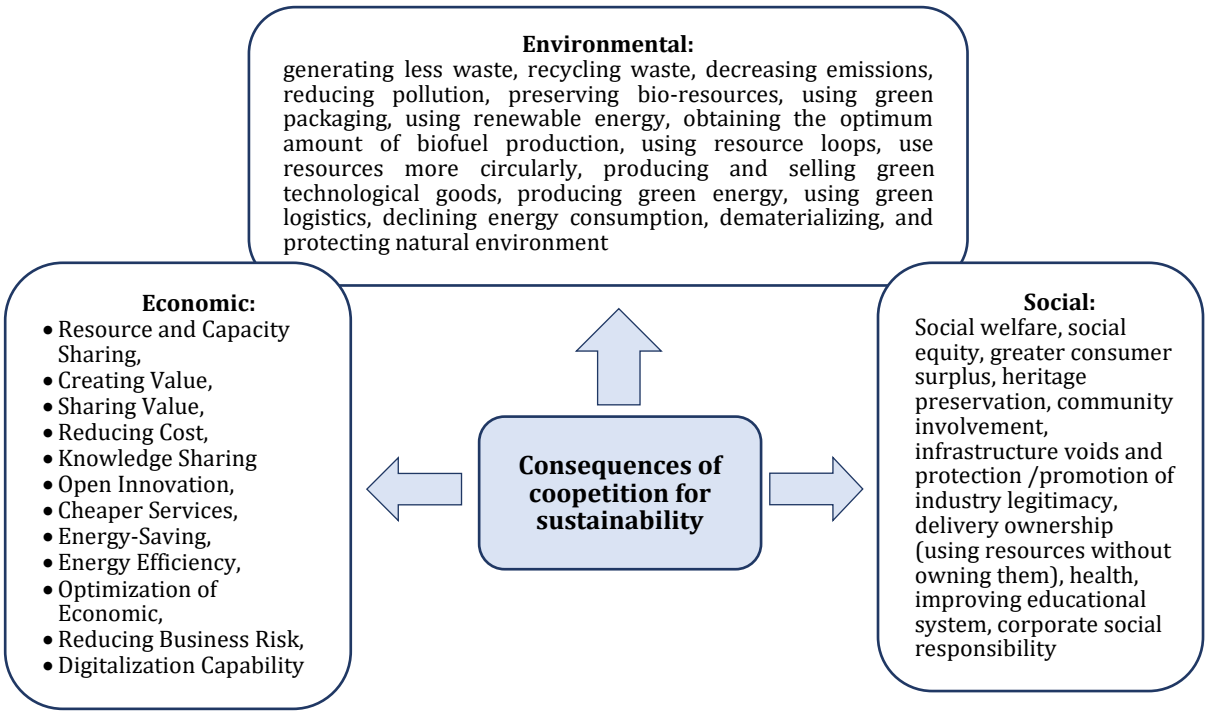
For social aspects of sustainability, coopetition can lead to social welfare, social equity, community involvement, and greater consumer surplus. Also, coopetition helps healthcare providers (doctors, nurse practitioners, radiologists, labs, hospitals, urgent care clinics, medical supply companies, and other professionals, facilities, and businesses that provide such services) to provide better and faster services. One of the best examples of coopetition was the collaboration between two companies BioNTech and Pfizer, to make a corona vaccine. Additionally, establishing well-conceived and well-managed cooperation networks of educational institutions (preschools, childcare, primary-elementary schools, secondary-high schools, and universities) can facilitate upgrading the education system. Moreover, coopetition allows companies to use resources without owning them by providing the possibility of sharing resources. It refers to the archetype “Deliver functionality, not ownership” in the sustainable business model. Furthermore, companies in an industry achieve corporate social responsibility through cooperation to address infrastructure voids and protection/promotion of industry legitimacy. Preserving heritage is the other consequence of coopetition strategy for the social dimension of sustainability.

For the economic dimension of sustainability, coopetition strategy provides the basis for sharing resources and capacities. Sharing resources, knowledge, ownership, and

wealth is the advantage of coopetition for the economic part of sustainability. In addition, coopetition helps to create and share value for all companies involved in this relationship and create positive value for all stakeholders. Coopetition strategy also reduces costs. Innovation is one of the most frequently studied dependent outcome variables in coopetition. In the economic dimension of sustainability, we see *open innovation*, so to achieve this, we definitely need to apply coopetition. Cheaper services, energy saving, energy efficiency, and optimization of economic performance are other consequences of coopetition strategy for the economic dimension of sustainability. Also, coopetition helps the sustainable performance of businesses through digitalization capability.

Notably, most of the extracted codes regarding the consequences of coopetition strategy for sustainability are consistent with the archetypes of Bocken's (2019) sustainable business model. It was mentioned in the background section that Bocken et al. (2019) presented a new version of the sustainable business model with three environmental, social, and economic dimensions. The environmental dimension includes three archetypes: maximizing material and energy efficiency, closing resource loops, and substituting with renewables and natural processes. The social dimension includes three archetypes: deliver functionality not ownership, adopt a steward-ship role, and encourage sufficiency. The economic dimension includes three archetypes: repurpose for society/ environment, create inclusive value, and develop sustainable scale up solutions.

Figure 4.
A Framework of Consequences of Coopetition Strategy for Sustainability



(Source: Researcher's Findings)

Discussion and Conclusion

Our review has provided a comprehensive overview of coopetition for sustainability. This

study collected and analyzed the literature and theoretical perspectives on the topic of coopetition for sustainability using a systematic review approach. Coopetition is a developing concept that can be introduced as a paradigm replacing the attitude of mere competition between competitors with cooperation. On the other hand, the concept of sustainability has become so important in today's era that any new discussion about environment and development is considered incomplete without considering this concept.

Like other conducted researches, the analyses and results of this research are subject to some limitations that are discussed as follows: despite all the efforts to ensure that the statistical population of this research included all related studies, some constraints were unavoidable. First, the scientific databases only included registered studies. Second, limited access to some articles and the non-English language of some articles registered in the scientific databases posed additional challenges. Consequently, the findings of unregistered, inaccessible, and non-English articles are not included in this study.

In summary, this study, using a systematic review of published articles on coopetition for sustainability, showed that coopetition strategy is a very important approach for businesses to achieve sustainability and, on a broader scale, affects the sustainability of societies. Additionally, coopetition consequences affect all dimensions of sustainability: environmental, social, and economic. It is expected that this research contributes to future research and the firms engaged in coopetitive relationship for sustainability. Given the importance of coopetition for sustainability, future researchers should investigate its various dimensions and aspects, exploring its consequences in diverse context to develope a comprehensive model in this field.

Since digital technology plays an important role in improving the efficiency of businesses, reducing the production of waste, and losing resources, paying close attention to this issue is very important. Also, relationship between companies in the evolving digital ecosystems are fluid and dynamic. As traditional industries undergo digital transformation, coopetition become a central issue. In addition, the application of a coopetition strategy leads to the achievement of digital capabilities, ultimately contributing to the sustainability of businesses.

This research aimed to provide a comprehensive framework outlining the consequences of coopetition for sustainability. The findings are not only valuable and essential for future researchers exploring this field but also offer practical insights for industry professionals. From an industrial perspective, the results provide valuable guidance for those focusing on sustainability, enhancing their understanding of how adopting a coopetitive strategy can contribute to business sustainability.

Finally, coopetition is a business strategy rooted in game theory helping businesses determine the optimal moment for rivals to work together. Cooperative games, as mathematical models, provide insights into how cooperation between competitors can increase benefits for all players and stimulate market growth. Coopetition is a strategy that brings considerable benefits to businesses in the current era. This research points out the benefits of using coopetition for sustainability.

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